

CLAIMS

What is claimed is:

1. A device for printing materials onto surface contacts on a circuit board or other electronic substrate, comprising:  
a stencil comprising a central body having one or more apertures formed through the stencil thickness to define a pattern for printing solder on said substrate, said central body of said stencil defined by four peripheral edges, wherein opposing edges are of equal length, and wherein each of said four peripheral edges of said stencil is provided with a plurality of receiving apertures.
2. The device as recited in claim 1, wherein said stencil is configured to be mounted on a support frame of an apparatus for supporting and tensioning said stencil to enable solder printing onto said circuit boards and other electronic substrates.
3. The device as recited in claim 2, wherein said stencil mounted on said support frame is positioned thereon so that said plurality of receiving apertures on said four peripheral edges of said stencil receive a corresponding plurality of teeth extending from corresponding edges of said support frame such that said stencil is secured and tensioned on said support frame at all peripheral edges so as to eliminate kinking or deformation of said stencil on said support frame .
4. The device as recited in claim 1, wherein said four peripheral edges of the stencil are all of equal length.
5. The device as recited in claim 1, wherein said stencil comprises a stencil foil comprising a thin metallic sheet.
6. The device as recited in claim 1, wherein said plurality of receiving apertures define elongated slots, said slots being separated by a plurality of elongated strips.

7. The device as recited in claim 6, wherein said elongated slots and elongated strips are of substantially the same width.

8. An apparatus for supporting and tensioning a stencil to enable solder printing of circuit boards and other electronic substrates, comprising:  
a support frame having four side members with each side member connected to another side member and including a channel which extends continuously through each side member;  
a displaceable mounting bar associated with each of said four side members with each mounting bar disposed within the channel and including a mounting plate, which carries a plurality of projections extending from the mounting plate to comprise a terminal side edge, and an inclined surface adjacent the mounting plate, which angles the mounting plate;  
a mechanism to bias each mounting bar away from another opposing mounting bar;  
a unitary inflatable tubular member disposed within the channel and extending through the four side members to displace each mounting bar toward another opposing mounting bar, and  
a stencil comprising a central body having one or more apertures formed through the stencil thickness to define a pattern for printing solder on said substrate, said central body of said stencil defined by four peripheral edges, wherein each of said four peripheral edges of said stencil comprises a plurality of receiving apertures, said receiving apertures configured to receive said plurality of projections on each of said mounting plates when said stencil is positioned on said support frame, such that when said mounting bars are biased away from each other said stencil is tensioned on all sides and kinking or deformation of said stencil on said support frame is eliminated.

9. The apparatus for supporting and tensioning a stencil of claim 8, wherein the channel comprises a substantially U-shaped section with an elongate outer wall and an elongate inner wall, wherein the inner wall is of greater length and height than the outer wall.

10. The apparatus for supporting and tensioning a stencil of claim 8, wherein the inner wall comprises an elongate support surface that the stencil abuts when the stencil is mounted to the support frame.

11. The apparatus for supporting and tensioning a stencil of claim 9, wherein the elongate support surface is curved to facilitate flexing of the stencil.

12. The apparatus for supporting and tensioning a stencil of claim 9, wherein the mechanism to bias each mounting bar away from another opposing mounting bar comprises a plurality of compression springs disposed along the inner wall of the channel adjacent each mounting bar and received by a plurality of bore holes disposed along the mounting plate to accept the plurality of compression springs.

13. The apparatus for supporting and tensioning a stencil of claim 8, wherein the plurality of projections is sized (of a dimension) to engage a plurality of receiving apertures disposed along each edge of the stencil.

14. The apparatus for supporting and tensioning a stencil of claim 13, wherein the plurality of projections do not extend into a horizontal plane of the stencil when the stencil is engaged and flexed thereon.

15. The apparatus for supporting and tensioning a stencil of claim 8, wherein the mounting plate is removably mounted to the inclined surface by a plurality of fasteners disposed against the inclined surface.

16. The apparatus for supporting and tensioning a stencil of claim 8, wherein the inflatable tubular member further comprises an air control mechanism connected to a first terminal end of the inflatable tubular member to control a supply of air to the inflatable tubular member.

17. The apparatus for supporting and tensioning a stencil of claim 16, wherein the air control mechanism includes an air inlet pipe with a terminal end removably connected to an external air supply and a release valve mounted to the air inlet pipe to control flow of air.

18. The apparatus for supporting and tensioning a stencil of claim 17, wherein the inflatable tubular member further comprises a second terminal end which is closed.

19. The apparatus for supporting and tensioning a stencil of claim 8, wherein the four peripheral edges of the stencil are all of equal length.

20. The apparatus for supporting and tensioning a stencil of claim 8, wherein the stencil comprises a stencil foil comprising a thin metallic sheet.

21. The device as recited in claim 8, wherein said stencil comprises a stencil foil comprising a thin metallic sheet.

22. The device as recited in claim 8, wherein said plurality of receiving apertures define elongated slots, said slots being separated by a plurality of elongated strips.

23. The device as recited in claim 22, wherein said elongated slots and elongated strips are of substantially the same width.

24. A device for printing materials onto surface contacts on a circuit board or other electronic substrate, comprising:

a stencil comprising a central body having one or more apertures formed through the stencil thickness to define a pattern for printing solder on said substrate, said central body of said stencil defined by four peripheral edges, wherein opposing edges are of equal length, and wherein each of said four peripheral edges of said stencil is provided with a plurality of receiving apertures which define a plurality of elongated slots separated by a plurality of elongated strips, said elongated slots and said elongated strips being of substantially the same width.

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